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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/845,356	05/01/2001	Masayuki Mishima	Q64324	2603

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EXAMINER	
YAMNITZKY, MARIE ROSE	

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1794	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/845,356	MISHIMA, MASAYUKI	
	Examiner	Art Unit	
	Marie R. Yamnitzky	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 July 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *29,33-35,40,44 and 48-50* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *29,33-35,40,44 and 48-50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. This Office action is in response to applicant's amendment filed July 28, 2008, which amends the specification, amends claims 29, 33-35, 40 and 49, and cancels claims 36-39, 41-43 and 45-47.

Claims 29, 33-35, 40, 44 and 48-50 are pending.

2. This Office action is also in response to the Rule 132 Declaration of Masayuki Mishima filed July 28, 2008.

3. The rejection of claims 29, 33-35 and 49 under 35 U.S.C. 102(e) as anticipated by Forrest et al. (US 6,310,360 B1) is overcome by amendment.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 29, 33-35, 40, 44 and 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Forrest et al. (US 6,310,360 B1), in view of Egusa et al. (US 5,294,810) and either one of Igarashi et al. (US 2001/0019782 A1) or Thompson et al. (US 2002/0034656 A1).

Forrest et al. disclose light-emitting devices comprising a glass substrate, an anode, an organic compound layer including a light-emitting layer/zone containing three light emitting

materials, and a cathode. See the entire patent to Forrest et al. In particular, see Fig. 1, Fig. 3, column 9, line 1 - c. 11, l. 60, c. 12, l. 58 - c. 13, l. 50, c. 14, l. 63 - c. 15, l. 17 and c. 17, l. 9 - c. 19, l. 19. Note that c. 11, l. 57 contains an error in that λ for $Ir(ppy)_3$ should read --~500 nm-- rather than "~400 nm". In Forrest's Example 1, the light-emitting layer consists of an alternating series of layers of CBP doped with $Ir(ppy)_3$ and CBP doped with DCM2.

"CBP" stands for 4,4'-N,N'-dicarbazole-biphenyl, which is a blue light-emitting material having a light-emitting wavelength peak of about 400 nm.

"$Ir(ppy)_3$" stands for *fac* tris(2-phenylpyridine) iridium, which is a green light-emitting orthometallated complex of iridium having a light-emitting wavelength peak of about 500 nm.

"DCM2" is the abbreviation for a pyran compound that is a red light-emitting compound having a light-emitting wavelength peak of about 590 nm (the full name is given at c. 4, l. 56-58 and the formula is shown at the bottom of c. 9).

Forrest et al. disclose a device comprising more than one light-emitting material, each of the materials capable of emitting light of a different color, wherein one of the materials is an orthometallated complex. In Forrest's device of Example 1, green and blue-light emitting materials are contained in one light-emitting layer while red and blue-light emitting materials are contained in a second light-emitting layer.

In Forrest's device, the light-emitting layers only comprise one orthometallated complex (the green light-emitting material $Ir(ppy)_3$). Forrest et al. do not disclose a device utilizing an orthometallated complex, such as an iridium complex of a 2-phenylquinoline derivative, as the

red light-emitting material whereas all of the pending claims require the red light-emitting material to comprise at least one orthometallated complex.

With respect to present claim 48, Forrest et al. do not disclose a device in which red, green and blue emitting materials are contained in the same layer.

With respect to present claim 49, Forrest's device of Example 1 does not have three different light-emitting layers, each containing only one of the blue, green or red light-emitting materials.

With respect to present claim 50, the device of Forrest et al. does not emit white light.

It was known in the art at the time of the invention that the color of light emitted by a light-emitting device can be controlled by the selection of light-emitting materials used in the device, and that emission of white light can be achieved by providing an appropriate combination of light-emitting materials.

Egusa et al. disclose light-emitting devices, teach that a light-emitting device may comprise more than one light-emitting layer (e.g. see column 11, line 40 - c. 12, l. 60 and c. 19, l. 52 - c. 20, l. 61), teach that different light-emitting materials may be mixed in a light-emitting layer in order to control light-emission wavelength and that the mixture may include a phosphorescent material emitting light from a triplet excited state (e.g. see c. 25, l. 36 - c. 27, l. 15), and teach that it is possible to achieve emission of white light from a device comprising multiple light-emitting layers and from a device comprising a mixture of light-emitting materials (e.g. see c. 20, l. 57-61 and c. 26, l. 15-28).

It would have been an obvious modification to one of ordinary skill in the art at the time of the invention to provide light-emitting devices similar to those disclosed by Forrest et al. but utilizing different and/or additional light-emitting materials in combination with the iridium complex $Ir(ppy)_3$, either in the same layer or in a light-emitting layer separate from the layer comprising the iridium complex. One of ordinary skill in the art would have been motivated to utilize different and/or additional light-emitting materials in combination with the iridium complex so as to provide a device having the advantages of using a phosphorescent material as taught by Forrest et al. while at the same time being able to modify the color of light emitted by the device as taught by Egusa et al. It would have been within the level of ordinary skill of a worker in the art at the time of the invention, as a matter of routine experimentation, to determine suitable and optimum combinations of light-emitting materials selected from known light-emitting materials so as to obtain a functional device capable of emitting light of the color(s) desired. One of ordinary skill in the art would have been motivated to select a combination of light-emitting materials capable of providing white light when the light-emitting device was intended to be used for an application where white light was desirable.

With respect to the requirement for an orthometallated complex as the red light-emitting material, orthometallated complexes that emit red light were known in the art at the time of the invention. Igarashi et al. disclose orthometallated complexes that emit red light and that are iridium complexes of a 2-phenylquinoline derivative (e.g. see paragraphs [0102]-[0125], [0177]-[0182] and [0186]). Thompson et al. also disclose orthometallated complexes that emit red light and that are iridium complexes (e.g. see Fig. 31, Fig. 37, Fig. 43 and paragraph [0183]). The

selection of suitable and optimum combinations of red, green and blue light-emitting materials from known materials would have been within the level of ordinary skill of a worker in the art at the time of the invention as a matter of routine experimentation.

Thompson's published application claims priority of several prior non-provisional applications. The referenced portions of Thompson's published application find support at least in Thompson's priority application No. 09/452,346, filed December 01, 1999.

Applicant cannot rely upon the foreign priority papers to overcome the rejection in further view of Igarashi et al. because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

6. Claims 29, 33-35, 40, 44 and 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baldo et al. in *Appl. Phys. Lett.* 75(1), pp. 4-6 (July 5, 1999), in view of Egusa et al. (US 5,294,810) and either one of Igarashi et al. (US 2001/0019782 A1) or Thompson et al. (US 2002/0034656 A1).

Baldo et al. disclose light-emitting devices comprising a glass substrate, an anode, an organic compound layer including a light-emitting layer containing two light emitting materials, and a cathode. See the whole reference. In various devices, the light-emitting layer contains $Ir(ppy)_3$ and CBP.

"CBP" stands for 4,4'-N,N'-dicarbazole-biphenyl, which is a blue light-emitting material having a light-emitting wavelength peak of about 400 nm.

"$Ir(ppy)_3$" stands for *fac* tris(2-phenylpyridine) iridium, which is a green light-emitting orthometallated complex of iridium having a light-emitting wavelength peak of about 500 nm.

In Baldo's device comprising CBP doped with $Ir(ppy)_3$, a single light-emitting layer contains green and blue light-emitting materials. Baldo et al. do not disclose a device in which a red light-emitting material is used in combination with a blue light-emitting material and a red light-emitting material as required by the present claims. Further, Baldo's devices do not have different light-emitting layers as required by present claim 49, and do not emit white light as required by present claim 50.

It was known in the art at the time of the invention that the color of light emitted by a light-emitting device can be controlled by the selection of light-emitting materials used in the device, and that emission of white light can be achieved by providing an appropriate combination of light-emitting materials.

Egusa et al. disclose light-emitting devices, teach that a light-emitting device may comprise more than one light-emitting layer (e.g. see column 11, line 40 - c. 12, l. 60 and c. 19, l. 52 - c. 20, l. 61), teach that different light-emitting materials may be mixed in a light-emitting layer in order to control light-emission wavelength and that the mixture may include a phosphorescent material emitting light from a triplet excited state (e.g. see c. 25, l. 36 - c. 27, l. 15), and teach that it is possible to achieve emission of white light from a device comprising multiple light-emitting layers and from a device comprising a mixture of light-emitting materials (e.g. see c. 20, l. 57-61 and c. 26, l. 15-28).

It would have been an obvious modification to one of ordinary skill in the art at the time of the invention to provide light-emitting devices similar to those disclosed by Baldo et al. but utilizing additional light-emitting materials in combination with the iridium complex either in the same layer or in a light-emitting layer separate from the layer comprising the iridium complex. One of ordinary skill in the art would have been motivated to utilize additional light-emitting materials in combination with the iridium complex so as to provide a device having the advantages of using a phosphorescent material as taught by Baldo et al. while at the same time being able to modify the color of light emitted by the device as taught by Egusa et al. It would have been within the level of ordinary skill of a worker in the art at the time of the invention, as a matter of routine experimentation, to determine suitable and optimum combinations of light-emitting materials selected from known light-emitting materials so as to obtain a functional device capable of emitting light of the color(s) desired. One of ordinary skill in the art would have been motivated to select a combination of light-emitting materials capable of providing white light when the light-emitting device was intended to be used for an application where white light was desirable.

With respect to the requirement for an orthometallated complex as the red light-emitting material, orthometallated complexes that emit red light were known in the art at the time of the invention. Igarashi et al. disclose orthometallated complexes that emit red light and that are iridium complexes of a 2-phenylquinoline derivative (e.g. see paragraphs [0102]-[0125], [0177]-[0182] and [0186]). Thompson et al. also disclose orthometallated complexes that emit red light and that are iridium complexes (e.g. see Fig. 31, Fig. 37, Fig. 43 and paragraph [0183]). The

selection of suitable and optimum combinations of red, green and blue light-emitting materials from known materials would have been within the level of ordinary skill of a worker in the art at the time of the invention as a matter of routine experimentation.

Thompson's published application claims priority of several prior non-provisional applications. The referenced portions of Thompson's published application find support at least in Thompson's priority application No. 09/452,346, filed December 01, 1999.

Applicant cannot rely upon the foreign priority papers to overcome the rejection in view of Igarashi et al. because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

7. Applicant's arguments and the Rule 132 Declaration filed July 28, 2008 have been fully considered but they are not persuasive.

Applicant argues that the prior art devices differ from the device of the present invention in functional mechanism as well as construction.

Applicant's arguments regarding thickness of the layers and transfer of triplet exciton energy from the green emission layer to the red emission layer are not persuasive as the present claims place no limitation on the thickness of the light-emitting layer(s), and there is no requirement for transfer of triplet exciton energy from a green emission layer to a red emission layer (or more broadly, from a green light-emitting material to a red light-emitting material). Further, while the disclosure as originally filed teaches an advantage of using phosphorescence obtained from triplet excitons, this advantage was known in the art at the time of the invention

(as admitted, e.g., on page 3 of the specification), and while the disclosure teaches that more than one phosphorescent material may be used in a single device, the examiner finds no explicit teaching of transferring triplet exciton energy from one phosphorescent material to another within such a device.

With respect to the Rule 132 Declaration, it is the examiner's position that the data set forth in the declaration do not demonstrate unexpectedly superior results commensurate in scope with the claims.

With respect to Examples 1, 2, 3 and 4, and Comparative Examples 1 and 2, the examiner notes that there are two discrepancies between the data for these examples as set forth in Table 2 in the declaration and the corresponding data in the specification. Based on the specification, Comparative Example 2 utilizes a fluorescent red light-emitting material as well as a fluorescent green light-emitting material whereas Table 2 in the declaration lists the red light-emitting material as phosphorescent. Also, Lmax(Cd/m^2) for Example 2 is disclosed as 3800 in the specification (Table 1, page 24) whereas Table 2 in the declaration lists the value as 38000.

Even if the Lmax(Cd/m^2) for Example 2 is correct as listed in Table 2 of the declaration (rather than the much lower value disclosed in the specification), it is the examiner's position that the data would only appear to support an argument that using bis(2-phenylquinoline) acetylacetonato iridium complex in combination with tris(2-phenylpyridine)iridium complex provides unexpectedly superior results compared to the use of either of these two iridium complexes without the other. (If the Lmax(Cd/m^2) for Example 2 is correct as listed in the specification, then the data do not support such an argument.) However, none of the pending

claims require these two specific iridium complexes. The present claims do not limit the green and red light-emitting orthometallated complexes to specific complexes, and place no specific limitation on the blue light-emitting material. The blue, green and red light-emitting materials can be selected from various known materials. The examiner maintains the position that the selection of suitable and optimum combinations of red, green and blue light-emitting materials from known materials would have been within the level of ordinary skill of a worker in the art at the time of the invention as a matter of routine experimentation.

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 7:00 a.m. to 3:30 p.m. Monday-Friday.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

/Marie R. Yamnitzky/
Primary Examiner, Art Unit 1794

MRY
November 10, 2008